RFID TECHNOLOGY IMPLEMENTATION AND ITS USE IN ENGINEERING COLLEGE LIBRARIES IN KARNATAKA STATE: A STUDY

K. J. SHOBHA[1] & RAMESHA[2]

[1]*Librarian, RNS Institute of Technology, Channasandra, Bangalore, Karnataka, India*

[2]*Associate Professor, Department of Library and Information Science, Bangalore University, Bangalore, Karnataka, India*

ABSTRACT

Technology produces all kinds of activity performances in a better and advanced way. To survive in the competence and to satisfy the tech savvy user demands, the libraries should resume the structure with new technologies. One such new technology application, which is used in various activities of the libraries since 21st century, is the RFID technology. Library management's key role is to satisfy the user needs. Emerging technologies like RFID, Biometrics and Smart Cards are some of the practical growth of Communication Information technologies used for effective administration and management in the Libraries. These developments in the technology, effectively improves the self service and the collection management in this tech savvy era. In this study, it was investigated whether RFID technology is neither useful, nor effective for the library activities by using a survey method. This survey is conducted within Karnataka state; finally, choosing Dayananda Sagar College of Engineering, Acharya Institute of technology and PES Institute of Technology among engineering colleges and DRTC, Khanija Bhavan Mining Library, National Law School, Bangalore university, Infosys (Mysore Region) among other than engineering colleges as the samples for the study. These colleges/organizations were chosen, considering as the best suited sample for this study because of the implementation, usage and applications in functional attitudes in these libraries. Data were collected by the way of Questionnaire, interview, and observation, and then they were analyzed according to their intended purpose.

KEYWORDS: *RFID, Library Management, Engineering College Library, Radio Frequency Identification & Tech Savvy Libraries*

Original Article

INTRODUCTION

RFID is a technology that uses radio waves to automatically identify people or objects. Here, RF in RFID stands for "radio frequency"; the "ID" means "identifier." RFID tags are intelligent bar codes that can talk to a networked system to track every product that we put in our library. The antenna enables the chip to transmit the identification information to a reader. The reader converts the radio waves reflected back from the RFID tag into digital information that can then be passed on to computers that can make use of it (FAQ, 2014).

In the Integrated Digital Library environment, library activities and services main aim is to provide high level user satisfaction. User dependent services are upholding the autonomy of the users who are in transition. In these circumstances, contactless RFID Tags enables access control. RFID is applied for automatic identification and tracking of library materials. Wireless sensors incorporated in RFID systems are important detective and identifying components used in library applications. Unique Identification is one of the important feature which enables RFID in tracking the objects. The purpose of this article is to find out the useful and effectiveness of the RFID Technologies applications in engineering college library activities.

REVIEW OF LITERATURE

Ferguson and **Thornley** and Gibb (2014) explore how library managers go about implementing RFID (radio frequency identification) technology and particularly how associated privacy issues have been managed. Authors found the need to accomplish staff for client –oriented services, which provides the user some kind of self service. They also observed RFID technology's impact on patron privacy through increased opportunity for self check and self services. Authors analyzed that the ethical issues were not a central part of the process of implementing RFID technology. Study recommends implementing RFID technology as a current practice of new technologies in libraries. **Radha and Trivedi(2014)** examines RFID technologies importance. They found its importance in a wide range of markets including livestock identification and Automated Vehicle identification system due to its capacity to track moving objects. Authors discussed its components, RFID Vs. barcode technology, and the success of RFID technology in Indian academic libraries. They concludes that the new technology has advantage as well as disadvantage, still it is very good system to track the materials and for theft control at library. *Kattimani and Naik (2013)* evaluates the competences in library professionals and information communication and technology (ICT) skills among the engineering college library professionals across VTU ,Karnataka. They used questionnaire, observation and interactions among library professionals to collect data. Study found that librarians have more skills on web designs compared to other designations in the library. They suggests for organizing more workshops and conferences to improve the competences and ICT Skills among library professionals. **Makori (2013)** investigates the adoption of RFID technology for information services and activities at Kenyan university Library. Author uses survey method to collect the data. Author found that few of the university libraries are using the RFID technology for the information services and activities. He states the various problems like lack of ICT policies, funding, budget, ICT competences and skills to handle the technology in the library. The Study recommends for the improvement in ICT Skills and competences to strengthen, improve, build and support the information work and activities in the university Library. **Madhusudhan (2010)** examines the use and implementation of RFID technology at the Indian Law Institute Library and National Social Science Documentation Centre Library, Delhi. Author conducts a survey through questionnaire method. He found that the implementation of RFID technology in libraries increased the transaction speed, and the utilization of library services has also been increased. Author urges for the urgent need to develop Indian libraries with RFID enabled technologies, to face global competition. Finally concludes by saying "it is no longer seen as a novelty, but much more as a significant tool that enables library managers to transform and modernize the library services and activities". **Kumar and Kaur (2010)** Author provides the guidelines for the evaluation of different systems by describing components and technical features of modem RFID library system. He also briefs about tentative cost of implementing RFID system in a library and also discusses the advantages and disadvantages of RFID system in libraries**. Douglas** (2010) Presents various basic concepts of RFID Technology and indicates applicability in the library setting. He states about a foundation for addressing privacy concerns regarding the use of RFID in the library.

ANALYSIS OF THE DATA

Engineering College Libraries Using RFID Technology in Karnataka State

There are 77 engineering colleges are imparting engineering education in Bangalore city. The survey report clarifies that there are three Engineering colleges namely, Dayananda Sagar College of Engineering, Acharya Institute of technology and PES Institute of Technology are using this technology and Documentation Research and Traning Center (DRTC), National Law School, Department Mining and Geology Library (Khanija Bhavan), Bangalore university, Infosys (Mysore Region) among other than engineering colleges taken as the samples for the study. Dayanada

Sagar College of Engineering is using the complete package of RFID Technology for their library activities. Acharya Institute of technology is just attempting to implement the Technology. PES Institute of Technology is using the Electronic Article Surveillance (EAS) for security purpose and it is not exactly the RFID technology. DRTC and National Law School (NLS) are using electromagnetic tapes to avoid book loss which is mainly serving towards security purpose. Bangalore University, Department of Mines and Geology Library (Khanija Bhavan), Infosys (Mysore region) have taken up the complete package of RFID Technology for their library activities.

Distribution of Questionnaire

A survey was conducted among the engineering colleges to find out the implementation of RFID technology in the libraries. Telephonic Interview method was conducted among the engineering colleges to find out the RFID applications in the libraries. Through this method, it has shown that three colleges such as Dayananda Sagar College of Engineering, Acharya Institute of technology and PES Institute of Technology are using this technology. To enhance the sample data, Organizations such as DRTC, National Law School, Department of Mines and Geology Library (Khanija Bhavan), Bangalore University, Infosys (Mysore Region) are taken as other than engineering college sample studies. Hence, the structured questionnaire was designed and distributed to the librarians of only these identified engineering college libraries and organizations for the study.

Periodicity of RFID Technology Usage in the Libraries

For the purpose of collection of data by period wise, the utility of the technology is categorised into four groups as recently using, using since 5 years, using since 10 years and using more than 10 years. Table 1 indicates that the periodicity of the RFID Technology using in these colleges.

Table 1: Period – Wise Distribution

Sl.No.	Institution	Periodicity			
		Will Start to Use within one or Two Months	Using Since 5 Years	Using Since 10 Years	Using More than 10 Years
1.	Dayananda Sagar College of Engineering			✓	
2.	Acharya Institute of technology	✓			
3.	PES Institute of Technology				✓
4.	DRTC			✓	
5.	National Law School (NLS)		✓		
6	Department of Mines and Geology Library (DMG)		✓		
7.	Bangalore University		✓		
8.	Infosys (Mysore)		✓		

A table 1 shows that Dayananda Sagar College of Engineering and PES Institute of Technology are using this technology since 10 and more than 10 years. Whereas, Acharya Institute of technology will start to use within one or two months. DRTC is using since 10 years. Whereas National Law School, Department of Mines and Geology Library (Khanija Bhavan), Bangalore university, Infosys (Mysore) are using within 5 years.

Distribution of RFID Facility Implementation in the Libraries

The RFID facility implementation is shown in Table 2. Dayananda Sagar College of Engineering has implemented all the facilities like Library Automation with RFID Tag, Transactions, Inventory, Security/Surveillance purpose. Same way, Department of Mines and Geology Library (Khanija Bhavan), Bangalore University Library, Infosys (Mysore) Library are taken the complete package and customized to their usage. Acharya Institute of technology also planning to go for all the above facilities, whereas, PES Institute of Technology, DRTC is using this technology only for security purpose as they are having only the Electronic Article Surveillance (EAS) with metal detector which helps only for the detection of the unauthorized library materials of the patrons out of the library while National law college is using electromagnetic tapes which are invisible self adhesive tapes which sends the beeping sound to the antenna for the non swiped materials mainly serves to track moving objects.

Table 2: Distribution of RFID Facilities

Sl. No	Institution	Library Automation with RFID Tag	Transaction	Inventory	Security/ Surveillance	All of them
1.	Dayananda Sagar College of Engineering					✓
2.	Acharya Institute of technology					✓
3.	PES Institute of Technology				✓	
4.	DRTC				✓	
5.	National Law School (NLS)				✓	
6	Department of Mines and Geology Library (DMG)					✓
7.	Bangalore University					✓
8.	Infosys (Mysore)					✓

Classification of the Accuracy of the RFID Software Facilities

RFID technology is having a great impact on libraries, which provides effective improvement with the kind of self sufficient management in the library activities. This table depicts the accuracy of the technology in the different areas of the library activities through the grading as Excellent, very good, good, satisfied and poor as follows:

Table 3: Accuracy of the RFID Facility

Facility	Grading	Engineering Institutions			Other Organizations				
		DSCE	PES IT	AIT	DRTC	NLS	DMG	BU	Infy
Automation with RFID Tags	Excellent								
	Very good	✓					✓	✓	✓
	Good								
	Satisfied								
	poor								
	Yet to test			✓					
Transaction	Excellent								
	Very good	✓					✓		
	Good							✓	✓
	Satisfied								

		DSCE	PESIT	AIT	DRTC	NLS	DMG	BU	INFY
	poor								
	Yet to test			✓					
Inventory	Excellent								
	Very good	✓					✓		
	Good								
	Satisfied		✓				✓	✓	✓
	poor								
	Yet to test			✓					
Security/Surveillance	Excellent								
	Very good	✓					✓	✓	✓
	Good				✓	✓			
	Satisfied		✓						
	poor								
	Yet to test			✓					

Abbreviation Descriptions

- DSCE: Dayananda Sagar College of Engineering

- PESIT: PES Institute of Technology

- AIT: Acharya Institute of Technology

- DRTC: Documentation Research and Training Centre

- NLS: National Law School

- DMG: Department of Mining and Geology

- BU: Bangalore University

- INFY: Infosys, Mysore

Table 3 reveals the accuracy of the RFID facilities in the libraries. It is observed that Dayananda Sagar College of Engineering, Department of Mining and Geology, Bangalore University and Infosys rates very good for the Automation, Transaction, inventory and security/surveillance purposes. PES Institute of Technology, National Law School, Bangalore University is using only for security/Inventory purpose and they are satisfied with the facility. While Acharya Institute of technology is yet to test the accuracy of the technology as it is still under process of the facility.

Usability of RFID Technology for Self Sufficient Activities

The exponential growth and development of Information and Communication technology (ICT) provides service to the users in an interactive and self sufficient successful way. Library activities take place beyond the traditional boundaries with the development of emerging technologies like RFID applications. Its flexibility in working with high speed connections carrying various information and service made the libraries to apply and adapt the technology. The adoption of Radio Frequency Identification (RFID) technology promises solutions to Inventory, Kiosk for self check in /checkout, drop box inside / outside the library for returning the books, patrons' preference for self service for borrowing and returning the books etc.

In this survey, Dayananda Sagar College of Engineering, Department of Mining and Geology, Bangalore University, Infosys are using all these above self sufficient applications of the RFID technology extensively for their

library activities. And they rate the service as excellent and very good for the library activities. Further, the survey states the need for implementing this technology in libraries to satisfy the tech savvy users, for multipurpose Library Activity, Strong security and surveillance purpose.

MAJOR FINDINGS OF THE STUDY

- No. of Engineering colleges implemented RFID technology to the Library activities are very less (only 3no's.) in Karnataka State.

- Few Government organisations are also implementing RFID technology to their Library activities in Karnataka State.

- The study reveals that only one engineering college has implemented the Complete RFID technology for all library activities.

- It is observed that out of three engineering colleges, one college is using complete RFID technology to the library, one college is using only for the security purpose, and one more college is just applying the technology.

- The study shows that applications are very good in the areas like Automation, transaction, inventory, security and surveillance activities of the library.

- Security/surveillance in library has changed into more efficient system in Dayananda Sagar College of Engineering (DSCE) library, National Law School, Department of Mining and Geology, Bangalore University, Infosys after the RFID technology was set up.

- The study depicts that the self sufficient gadgets like Kiosk for self check in /check out, drop box inside / outside the library for returning the books and patrons self service preferences are also excellent and very good with the RFID Technology.

- Tech savvy users, multipurpose library Activities and Strong security and surveillance are the major need for implementing RFID Technology.

- RFID technology implementation is one of the powerful library management tools.

SUGGESTIONS

- Engineering colleges has to implement RFID Technologies for effective Library activities.

- Authorities of engineering colleges need to provide the RFID technologies in libraries towards the strengthening of libraries state of the art model.

- Librarians also should be able to persuade the management as the libraries are one of the major resource and information centre which reflects the college representation.

- Government also should encourage the libraries with more funds to create tech savvy environment for the users benefit.

CONCLUSIONS

The implementation of RFID technology is one of the examples of using the contemporary technologies for the enhanced administration of library system in the tech savvy world. Due to the rapid advances in the Information Communication technologies like computing technologies with large scale deployment of sensor network technologies, the management systems can be made anywhere, anytime, and real-time providing the suitable and necessary services. Even though the flexible enhanced systems of RFID, the technology is still not yet widely installed in the library environment as the cost is too high. Encouragement from the management to use the RFID technology will also be one of the reasons to optimize the usage of libraries.

REFERENCES

1. *Stuart Ferguson and Clare Thornley and Forbs Gibb (2014). How do libraries manage the ethical and privacy issues of RFID implementation? A Qualitative investigation into the decision making processes of ten libraries. Journal of Librarianship and information science. Download from http;//lis.sagepub.com/content/early/2014/02/14/0961000613518572.*

2. *L Radha Alias Nagalakshmi and Mayank Tridevi (2014). Success of RFID Technology in Indian academic libraries – A study. The International Journal's Research Journal of Science and IT Management, 3(8), p 51-58. Download from www.theinternatinaljournal.org*

3. *Shivaputrappa Fakkirappa Kattimani and Ramesh R Naik (2013). Evaluation of librarianship and ICT skills of library and information professionals working in the engineering college libraries in Karnataka, India: a survey. Program: electronic library and information systems, 47(4), p 344-368.*

4. *Elisha Ondieki Makori (2013). Adoption of FID technology in university libraries: A Kenyan perspective. Electronic Library, 31(2), p208-216.*

5. *Margam Madhusudhan (2010). RFID technology implementation in two libraries in New Delhi. Program: electronic library and information systems, 44(2), p149 – 157.*

6. *Anil Kumar and Paramjit Kaur (2010). RFID Technology in Libraries. Information Studies 16(4) , p229-242.*

7. *Blansit B Douglas (2010). RFID Terminology and Technology: Preparing to Evaluate RFID for Your Library, Journal of Electronic Resources in Medical Libraries,7(4), p344-354.*

8. *FAQ RFID Journal (Online Version 2014) Retrieved from*

9. *www.rfidjournal.com/faq on June 2014.*